***Chapter 3 Review: Matter and Its Changes***

***Sparking Questions*:**

What is “***matter***”? anything that has mass and takes up space

Who can tell me what a “***property***” is? something owned or ownership

What about a “***characteristic***”? a distinguishing trait, character, or property

What does “***identity***” mean? individuality

What does it mean to “***observe***” something or to make an “***observation***”? to see or sense through careful attention; the gathering of information

***Big Ideas*:**

Who can name a main idea found in this chapter about matter and its changes?

1. All matter has physical and chemical properties
2. The properties of matter can change
3. The physical properties of matter are observed or measured and they can change
4. Matter has chemical properties and the identity of matter can change

***Vocabulary*:**

Physical Property: any characteristic of a material that can be observed or measured without changing the identity of the material

Observation: involves seeing, hearing, tasting, touching, and smelling (some not in the lab)

Matter: anything that has mass and takes up space

Mass: the amount of matter in an object

Physical Change: the physical properties of a substance change, but the identity of the substance does not change

\*Who can give me an example? melting plastic changes the shape, but it is still plastic

other examples: butter, cheese, flat tire, painted house

Volume: the amount of space an object takes up (usually measure liquids by volume ex. 2 liter)

Density: the amount of mass a material has in a given volume (d=m/v)

Ex. same volume but different mass=kickball vs. bowling ball

States of Matter: 4-solid, liquid, gas, plasma…the state of matter of a substance depends on its temperature

Solid=tightly packed particles vibrate in a fixed position

-give the object a definite shape and volume

Liquid=particles move much faster and have more energy to slide past one another

-allows it to take the shape of its container

Gas=particles are moving so quickly that they can move freely away from other particles

Example: Jello is a solid when it is made properly and refrigerated…allow it to sit out and warm up and it will gradually become more liquid…heat it to boiling and it will become gaseous (can smell it throughout the house) to a point (until it burns)

Plasma=occurs at very high temperatures…ex. lightning, neon sign

\*\*Particles of matter move faster as higher temperatures are applied…they all move all the time.

Melting Point: the temperature at which a solid becomes a liquid

\*Which is higher, the melting point of an ice cube or an ice berg? They are the same.

The melting point does not change with the amount of substance.

Boiling Point: the temperature at which a substance in the liquid state becomes a gas

\*don’t get this confused…even though you still see liquid and bubbles the process is changing the liquid into a gas and you can observe this through steam…the boiling point does not change with the amount of substance only the length of time to get it to boil

\*If I have a clear liquid that boils at 60°C is the liquid water? depends on the pressure…if it is at atmospheric pressure then it is not water…however, water will boil at lower temperatures if it is at lower pressure as well…this summer we made water boil at room temperature by placing a beaker of water under a bell jar and removing the air in the jar. This decreased the pressure the water was under and allowed the particles to move more freely and the water began to boil.

\*boiling point does depend on the pressure a substance is under

Chemical Property: any characteristic that gives a substance the ability to undergo a change that results in a new substance.

\*What is an example of a chemical property? Flammable…wood to ashes

\*A chemical change does not have to be observed in the laboratory

Ex. rusting metal, silver tarnishes, copper turns green (penny), fruit turns brown

Chemical Change: any change that matter undergoes that results in the formation of a new or different substance

Signs of Chemical Change: bubbles, **heat**, light, smoke, color change, sound

Heat: a form of energy that flows from a warmer object to a cooler object

\*So, how do you decide if a chemical change has occurred? If a new substance has formed, can you reverse it?

Law of Conservation of Mass: matter cannot be created or destroyed during any chemical or physical change…the mass you start with is the mass you end with…you may only have different amounts of different substances

***True of False*:**

Matter is anything that has mass and takes up space…TRUE

During a physical change the identity of a substance changes…FALSE…chemical change

Color, shape, length, mass, and density are physical properties…TRUE

Nonmetals are malleable and ductile…FALSE…metals

There are 3 states of matter…FALSE…4, solid, liquid, gas, plasma

Matter has chemical properties…TRUE

Flammability is a physical property…FALSE…chemical

Mass is destroyed in fires and chemical reactions…FALSE…changed, but not destroyed (Law of Conservation of Mass)

The production of heat and light are signs that a chemical reaction has occurred…TRUE

***Summary*:**

What are some physical properties of matter?

What are the special physical properties of metals? malleability=metals can be pressed, hammered, rolled, ductility=metal that can be pulled into wires, magnetic=attracted to magnets, luster=shine

What are some chemical properties of matter?

Physical: color, shape, length, mass, volume, density, state of matter, melting point, boiling point

Chemical: flammability, reacts with water, light, or oxygen

***Final Thoughts*:**

So, why is all of this important?

Physical and Chemical properties of matter allows us to organize it…we can sort, separate, and organize materials by their properties.

\*How might we use physical or chemical properties to sort, or organize matter?

Ok final question…which is denser (has more mass in a given space) water at room temperature or ice??